CLAIMS

What is claimed is:

1. A method for reassembling a packet, the packet when reassembled includes a plurality of packet fragments with each packet fragment identified with a position within the packet, the method comprising:

maintaining a plurality of queues;

identifying for a particular packet fragment of the plurality of packet fragments a particular queue of the plurality of queues such that no already queued packet fragment in the particular queue comes after the particular packet fragment in the packet, wherein said identifying the particular queue for the particular packet fragment includes checking, at least when the particular queue is not empty, that the particular queue does not include a packet fragment which comes after the particular packet fragment in the packet; enqueuing the particular packet fragment at the end of the particular queue; and updating a data structure to include an indication of the particular queue in relation to the position of the particular packet fragment in the packet; and

retrieving the plurality of packet fragments from the plurality of packet queues based on the data structure to produce the packet.

2. The method of claim 1, wherein said retrieving the plurality of packet fragments is performed in response to identifying that all of the plurality of packet fragments have been enqueued in the plurality of queues.

3. The method of claim 1, including identifying that no queue in the plurality of queues does not already have enqueued a packet fragment in the particular queue which comes after the particular packet fragment in the packet, and in response, expanding the plurality of queues by adding the particular queue to the plurality of queues.

4. The method of claim 3, including reducing the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

5. The method of claim 4, wherein said reducing the number of queues includes removing the particular queue from the plurality of queues.

6. The method of claim 1, wherein the plurality of packet fragments are retrieved from the plurality of queues in order of their respective position within the packet.

5   7. The method of claim 1, wherein the data structure corresponds to a meta-packet or scorecard including the indications of the queues of the plurality of queues maintained in an order corresponding to the positions of their corresponding packet fragments within the packet.

8. The method of claim 1, wherein at least two packet fragments of the packet are

10   enqueued in a same queue of the plurality of queues.

9. A method for resequencing packets, the method comprising:

maintaining a plurality of queues of a resequencing mechanism;

receiving a particular packet of a stream of packets, each packet of the stream of packets identifying a sequence number of an ordered sequence of sequence numbers, the

15   particular packet including a particular sequence number;

identifying a particular queue of the plurality of queues such that no packet in the particular queue includes a sequence number subsequent to the particular sequence number in the ordered sequence, wherein said identifying the particular queue includes checking that the particular queue does not include a packet with a sequence number

20   subsequent to the particular sequence number in the ordered sequence;

enqueuing the particular packet at the end of the particular queue; and

retrieving packets in sequence from the plurality of queues.

10. The method of claim 9, including identifying that no queue in the plurality of queues does not include a packet with a sequence number subsequent to the particular sequence number in the ordered sequence, and in response, expanding the plurality of queues by adding the particular queue to the plurality of queues; and wherein said

5   identifying the particular queue includes said checking operation when the particular queue is not empty.

11. The method of claim 10, including reducing the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

12. The method of claim 11, wherein said reducing the number of queues includes

10   removing the particular queue from the plurality of queues.

13. An apparatus for reassembly of a packet, the packet when reassembled includes a plurality of packet fragments with each packet fragment identified with a position within the packet, the apparatus comprising:

a plurality of reassembly queues;

5   a reassembly mechanism; and

a distributor configured to acquire a particular packet fragment of the plurality of packet fragments and to identify a particular queue of the plurality of reassembly queues such that no already queued packet fragment in the particular queue comes after said particular packet fragment in the packet, wherein said identifying the particular queue

10   includes checking, at least when the particular queue is not empty, that the particular queue does not include a packet fragment which comes after said particular packet fragment in the packet; wherein the distributor is configured to cause said particular packet fragment to be enqueued at the end of the particular queue; wherein the distributor is configured to update a data structure to include an indication of the particular queue in

15   relation to the position of said particular packet fragment in the packet; and wherein the distributor is configured to identify when all packet fragments of the packet have been received and in response, to provide the reassembly mechanism with indications of the queues of the plurality of reassembly queues containing packet fragments of the packet and their order corresponding to that of the order of the plurality of packet fragments in

20   the packet; and

wherein the reassembly mechanism is configured to retrieve the plurality of packet fragments from the plurality of resequencing queues and reassemble the plurality of packet fragments to produce the packet.

14. The apparatus of claim 13, wherein the reassembly mechanism is configured

25   to retrieve the plurality of packet fragments from the plurality of resequencing queues in their respective order within the packet.

15. The apparatus of claim 13, wherein the distributor is configured to communicate a meta-packet or scorecard including said indications of the queues.

16. The apparatus of claim 13, wherein the distributor is configured to identify that every queue in the plurality of queues already includes a packet fragment corresponding to subsequent position in the packet and in response, causing the plurality of queues to expand in number by adding the particular queue to the plurality of queues.

17. The apparatus of claim 16, wherein the apparatus is configured to reduce the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

18. The apparatus of claim 17, wherein said reducing the number of queues includes removing the particular queue from the plurality of queues.

19. The apparatus of claim 13, wherein the distributor identifies a same particular queue of the plurality of reassembly queues for at least two of the plurality of packet fragments.

20. A method for resequencing and reassembling of packets, the method comprising:

maintaining a plurality of queues;

acquiring a packet fragment of a plurality of packet fragments of a packet, wherein a stream of a plurality of packets includes the packet;

identifying a particular queue of the plurality of queues for the particular packet fragment such that no already queued packet fragment in the particular queue comes after the particular packet fragment in the packet and the particular queue includes no already queued packet fragment of a packet subsequent to the particular packet in the stream of packets; wherein said identifying the particular queue includes checking, at least when the particular queue is not empty, that the particular queue does not include a packet fragment which comes after the particular packet fragment in the packet or the stream of packets; enqueuing the particular packet fragment at the end of the particular queue; and updating a data structure to include an indication of the particular queue in relation to the position of the particular packet fragment in the packet and the stream of packets; and

retrieving the plurality of packet fragments from the plurality of packet queues based on the data structure to produce the packet.

21. The method of claim 20, wherein said retrieving the plurality of packet fragments is performed in response to identifying that all of the plurality of packet fragments have been enqueued in the plurality of queues and no other packet prior to the packet in the stream of packets is enqueued in the plurality of queues.

22. The method of claim 20, including identifying that no queue in the plurality of queues does not already have enqueued a packet fragment in the particular queue which comes after the particular packet fragment in the packet or a packet fragment of a packet subsequent to the packet, and in response, expanding the plurality of queues by adding the particular queue to the plurality of queues.

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23. The method of claim 22, including reducing the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

24. The method of claim 23, wherein said reducing the number of queues includes removing the particular queue from the plurality of queues.

5   25. The method of claim 20, wherein the plurality of packet fragments are retrieved from the plurality of queues in order of their respective position within the packet and the order of the packet within the steam of packets.

26. The method of claim 20, wherein the data structure corresponds to a meta-packet or scorecard including the indications of the queues of the plurality of queues

10   maintained in an order corresponding to the positions of their corresponding packet fragments within the packet.

27. The method of claim 20, wherein at least two packet fragments of the packet are enqueued in a same queue of the plurality of queues.

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